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ABSTRACT

A project was conducted to determine (1) what former telecommunications technology students of Skyline College (California) are doing now; (2) students' perceptions of how well telecommunications technology met their educational needs; (3) what advanced skills courses students feel they need; and (4) whether assessment test scores, mathematics courses completed, or level of education could be used to predict an applicant's success in the program. Background information was obtained and questionnaires were sent to the 365 students who had taken all or some of the telecommunications technology courses. Responses were received from 115 former students. The average age of respondents was 30 years when enrolled in the program; about one-fourth were female. The study found the following: (1) 57 percent of the respondents are currently employed in the telecommunications industry--an increase of 58 percent over the number of respondents who were working in the industry before entering the program; (2) about one-half of the respondents said they completed one or more industry training courses after leaving Skyline College; (3) 64 percent of respondents felt that they received an employable skill and 59 percent said the program resulted in improved job mobility; (4) 51 percent said they had received job placement assistance--they were especially appreciative of the job fair; (5) former students said they learned best by hands-on laboratory courses, then demonstration and lecture, and they thought more hands-on experience was needed; and (6) respondents would have liked to have a variety of other technical courses, especially courses in switching theory, managing a telecommunications system, and microwave technology. (Extensive appendixes present data for various groups of respondents.) (KC)

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Telecommunication Technology
Skyline College

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STUDENT FOLLOW-UP

Students enrolled in Telecommunications Technology
Spring 1983 - Spring 1985.

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Fall, 1985

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PURPOSE

The purpose of this project was to ascertain

- what former Telecommunications Technology students are doing now.
- students' perceptions of how well Telecommunications Technology met their educational needs.
- what advanced-skills-courses students feel they need.
- whether assessment test scores, mathematics completed, or level of education could be used to predict an applicants' success in Telecommunications Technology.

BACKGROUND

Telecommunications Technology is a relatively new vocational program offered at Skyline College. The first course was offered during the Spring 1983 semester, with two additional courses added in subsequent semesters. There are three courses scheduled regularly, they are

TCOM 401 - Basic Skills for Telecommunications, which is a prerequisite to TCOM 430 and TCOM 440.

TCOM 430 - Fundamentals of Transmission and Carrier Systems.

TCOM 440 - Fundamentals of Data Communications

An additional course, TCOM 680 - Assembly Language Programming for the IBM PC, has been offered twice. This course is not part of the program but was taken by some of the Telecommunications Technology students.

Students must apply to this program by special application, separate from the College registration procedure. Additionally, between Spring 1983 and Spring 1985, all applicants took four assessment tests to measure math, reading, writing, spatial discrimination, and manual dexterity skills. Twelve students were accepted into advanced Telecommunications Technology classes on the basis of work experience.

PROCEDURES

Final grade sheets for TCOM 401, 430, and 440 were used to form a master list of all students enrolled in Telecommunications Technology between Spring 1983 and Spring 1985. The students were divided into five groups[1] according to the classes they had completed:

[1]See the corresponding Appendix for data on any particular student group.

1 - **Graduates** completed TCOM 401, 430, and 440.
2 - **Noncompleters** completed TCOM 401 but withdrew from TCOM 430 or TCOM 440. A grade of W is shown for these students.
3 - **Achievers** completed TCOM 401 and/or 430 but did not register for the next course; they did not receive a grade of W.
4 - **Nonachievers** withdrew from TCOM 401.
5 - **Experienced** students completed TCOM 440 but did not take TCOM 401 and/or 430.

The 365 students were identified as shown in Figure 1.

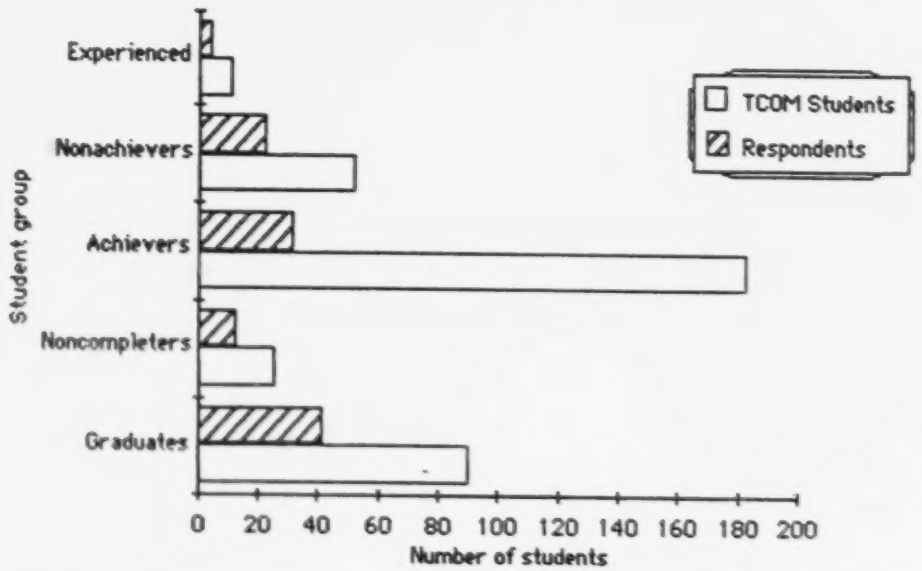


FIGURE 1. Students contacted for follow-up on Telecommunications Technology.

Background information (age and sex) were obtained from EIS[2] and former education, mathematics courses completed, and employment information were taken from the students' applications to Telecommunications Technology. Assessment test scores were procured from files in the Telecommunications Technology Office. Applications and assessment test scores were not available for Experienced students.

On September 16th a questionnaire was sent to each student. Copies of each questionnaire are in Appendices 1 through 5 and the cover letter sent to all students is in Appendix 6. Students currently enrolled in Telecommunications Technology were not contacted. Responses were

[2]San Mateo County Community College District's Educational Information System.

requested on or before October 16th. On October 15 through 25, nonrespondents were telephoned to remind them to complete the questionnaire. Duplicate questionnaires were sent to approximately 20 students who had moved. Questionnaires for Noncompleters and Nonachievers were sufficiently brief to ask these questions on the telephone during the follow-up calls.

RESULTS[3]

The average age of all students enrolled in TCOM 401 is **30 years** (range 18-55 years). **Females** account for **24%** of the enrollment. Student performance is shown in Figure 2.

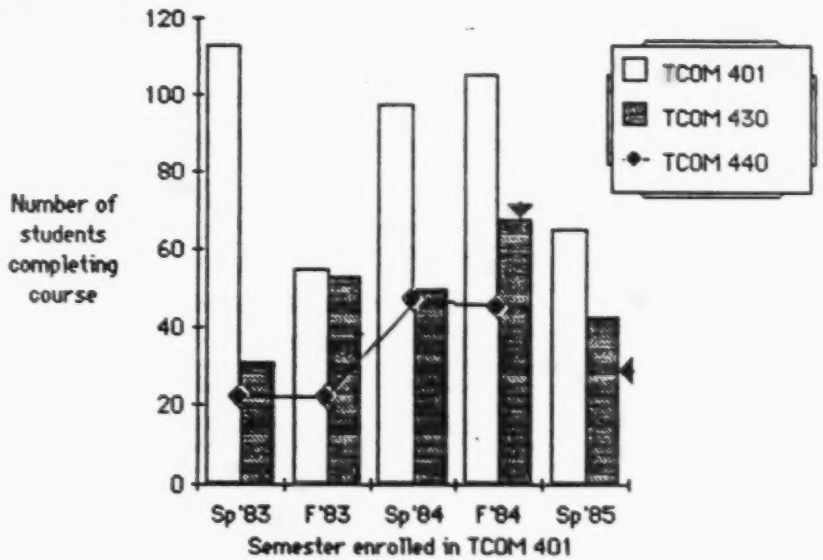


FIGURE 2. Number of students completing Telecommunications Technology courses by semester enrolled in TCOM 401. Arrows indicate students currently enrolled.

Questionnaires were sent to 365 former students. Ninety-six were defined as "address-unknown" after the letters were returned by the post office and attempts to track these individuals through the post office and telephone company were unsuccessful. Fifty-six percent of the address-unknowns are Achievers. Responses were received from 115 former students (**43%**) (see Figure 1). The average age of respondents was **30 years** (when

[3]Data for each student group are summarized in Appendices 1 through 5.

enrolled in TCOM 401). Eighty-seven of the respondents are males and 28 (24%) are **females**. The respondents reflect the age and sex distribution of the entire Telecommunications Technology student population. Responses and performance of males and females did not differ significantly, therefore, they were not summarized separately. Females are identified when they are employed in the telecommunications industry because women are underrepresented in scientific/technical areas and the success of these women is noteworthy. Data for each student group is summarized in Appendices 1 through 5.

If Graduates are viewed as the successful students, the level of mathematics completed beyond Elementary Algebra is not apparent as a significant factor toward achieving success in Telecommunications Technology. Most (54%) of the students in Telecommunications Technology had at least three years of high school mathematics (Figure 3).

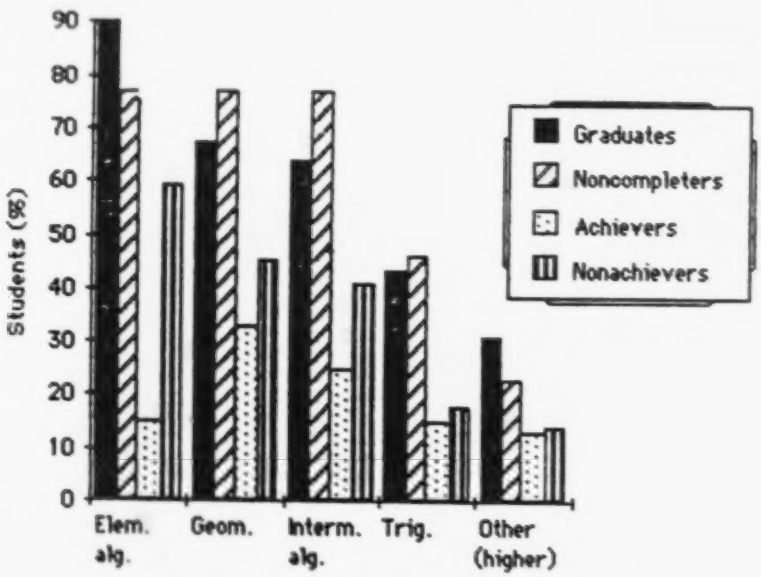


FIGURE 3. Mathematics courses completed by respondents.

Nonachievers have weaker math. training than Graduates and these students did not complete Telecommunications Technology, however, Noncompleters have comparatively good math. training and also did not complete Telecommunications Technology. The fact that Nonachievers dropped TCOM 401 may indicate that the level of mathematics is a factor or the reasoning skills developed in studying math. are a useful prerequisite. One Achiever commented that he felt a prerequisite level of math. including logs. and trig. functions was necessary for success.

Sixty-two percent of the students completed some higher education. There is a correlation between post-secondary education and success in the Telecommunications program (Figure 4). This phenomenon can be seen in other areas of the College as well and possibly indicates a *commitment* to education by the student that a high-school-only student may not have made.

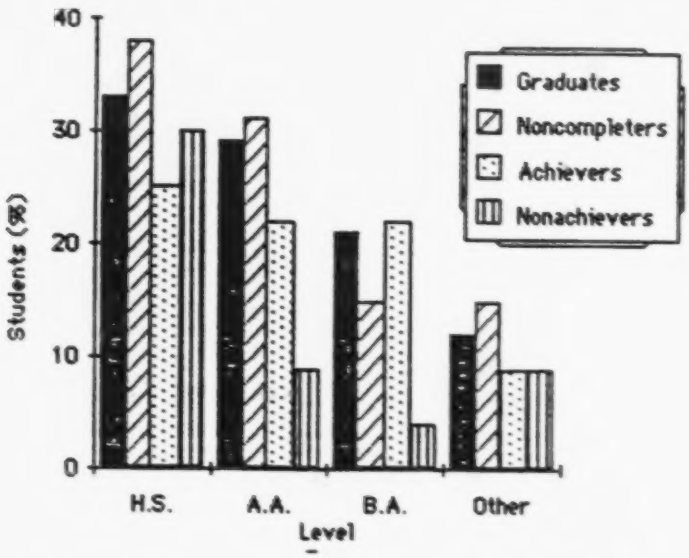


FIGURE 4. Education completed by respondents prior to enrolling in Telecommunications Technology.

Four assessment tests were given to students enrolling in TCOM 401 between Spring 1983 and Spring 1985. Although the assessment tests may have had validity in determining the minimum aptitudes required for success, the test scores do not correlate to program completion. No attempt was made to correlate assessment test scores to grades or salaries. Graduates had the widest range of scores, for example

	Numerical ability	
	Range	Average
Graduates:	40-17	29
Noncompleters:	39-24	32
Achievers:	37-13	29
Nonachievers:	39-19	28

The ranges of scores for each group overlapped on all tests and the average scores were virtually identical (see Figure 5).

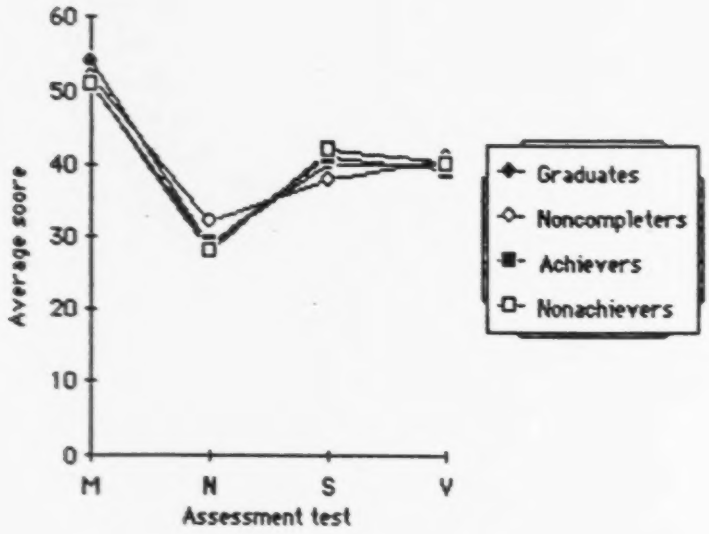


FIGURE 5. Average assessment test scores for each student group.
M=Mechanical reasoning (possible, 70). N=Numerical ability (possible, 40).
S=Spatial relationships (possible, 60). V=Verbal reasoning (possible 50).

WHAT THE RESPONDENTS ARE DOING NOW:

Fifty-seven **(50%)** of the respondents are currently **employed** in the telecommunications industry. This is an **increase** of **58%** over the number of respondents who were working in the telecommunications industry before entering Telecommunications Technology. Figure 6 illustrates employment by group.

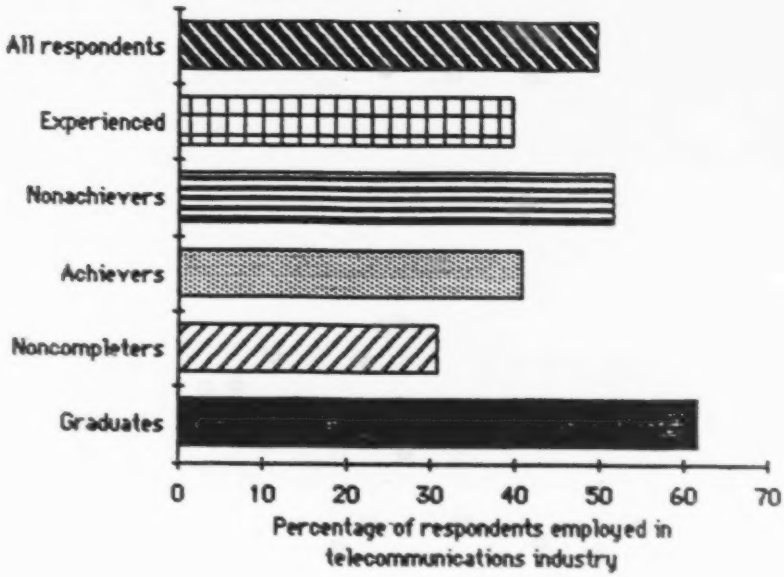


FIGURE 6. Respondents currently employed in telecommunications.

Sixty-two percent of the Graduates are working in telecommunications, only two said they are unemployed and looking for work. The average rate of employment for each group is **45%**. The average salary, of those answering, is **$13.00** per hour (some did not answer as per employer's policy).

Noncompleters, Achievers, and Nonachievers did not complete Telecommunications Technology and show an **increase** of **21%** in employment in the industry. One Noncompleter pointed out that "**the transmission class is useful in my new job.**" This suggests that some students got sufficient exposure and/or experience to apply for an entry-level position and then chose not to complete the Telecommunications Technology Program.

Almost half (**46%**) of the respondents said they completed one or more industry training courses after leaving Skyline College. Students who completed TCOM 401, 430, and 440 were required to learn about the equipment used by a particular company.

Twelve respondents are in school part-time and two, full-time. Four students are studying data communications or telecommunications management at other institutions, three are enrolled in TCOM 100[4].

WHAT THE RESPONDENTS SAID ABOUT JOB PLACEMENT:

Sixty-four percent felt that they received an **employable skill** and 59% said Telecommunications Technology resulted in improved **job mobility**. (21% felt that Telecommunications Technology did not improve their position or salary.)

When asked whether Telecommunications Technology provided an understanding of future careers in the telecommunications industry, 78% said yes.

When asked whether they received job placement assistance, 51% said yes. The job faire was praised by those students who participated in it. The former Qantas workers[5] were enamored by the placement assistance they received. Table 1 shows the responses of students to questions regarding career preparation received in Telecommunications Technology.

TABLE 1. Responses to the question:
HOW MUCH HELP WAS TCOM IN THE FOLLOWING AREAS?
(Responses given in percent.) (N=76)

	Much-Some
1 Knowing what the jobs are	64
2 Finding needed job-related information	53
3 Getting along with customers and coworkers	34
4 Being able to talk to the boss about job problems	34
5 Applying for a job	58
6 Interviewing for a job	49
7 Career advancement	57

In all items, responses for "some" were greater than "much". Items 5 and 6 were specifically requested by students when asked what types of job placement activities should be offered.

[4]TCOM 100 - Survey of Telecommunications was added to the Telecommunications Technology curriculum beginning in the Fall 1985 semester.

[5]Displaced workers enrolled in TCOM 401 during Spring 1984.

ABOUT COUNSELING:

Forty-four percent of the respondents said they did not seek counseling. Of the remaining students who did seek counseling, 66% said the help they got was average ("got some help") to low ("got no help"). One student added that the "**instructors are great**" as counselors.

Many of the students are inexperienced in higher education. Although enrollment in a program is a first step toward planning their futures, they need to make realistic goals. One student was disappointed when he found that starting salaries were $6 to $7 per hour and another dropped out of the program because he couldn't get a job after completing TCOM 401 and decided there wouldn't be any jobs after he completed TCOM 430 and TCOM 440. These students might benefit from guidance designed to help them see how education affects their entire future.

ABOUT INSTRUCTION:

Students said they learned best by hands-on lab., then demonstration and lecture. Reading and written homework were rated 3 on a scale of 1 to 5. When asked how instructional activities are used in Telecommunications Technology classes, the students were virtually unanimous in their responses, **80%** felt that more hands-on lab. was needed (see Figure 7).

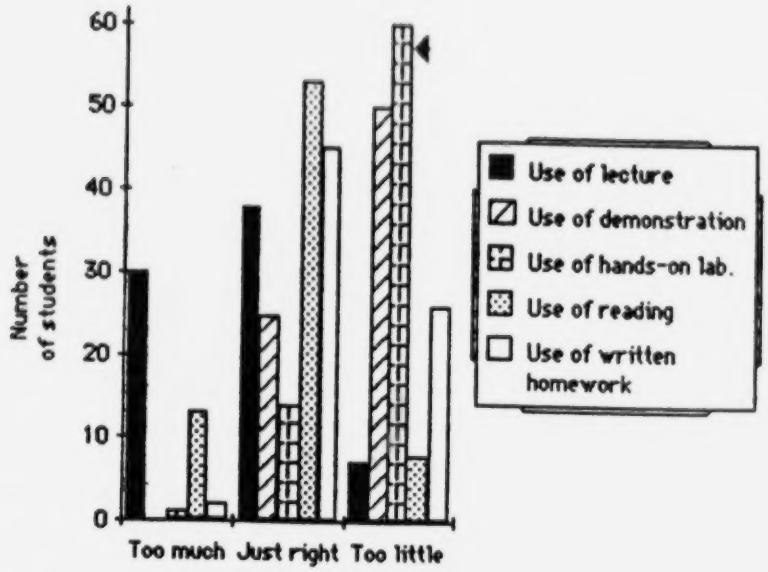


FIGURE 7. When asked how learning activities were used overall, a majority of the students felt that there was too little hands-on laboratory, see arrow. (N=75).

Although 64% of the students said their telecommunications classes taught them know how to use tools and equipment, many of the comments addressed the need for a fully functioning laboratory. It appears from the responses that some sections of some classes have not had any hands-on lab.

Respondents identified all of the following (Table 2) as additional courses for Telecommunications Technology. Table 2 shows the number of times a topic was identified as the most important.

TABLE 2. Responses to the question:
WHAT ADDITIONAL COURSES WOULD YOU LIKE TO SEE IN TCOM?
(Number of times item was ranked number 1.) (N=75)

Switching theory	16
Managing a telecommunications system	13
Microwave technology	10
Local area networks	10
Management training skills	9
Network management	6
Fiber optics	6
Satellite technology	5

These responses are consistent with the responses to "What learning experiences do you feel should be added to the TCOM program?" One respondent said that **"TCOM provides useful information but not enough regarding systems management."**

When asked when they would prefer to take additional Telecommunications Technology courses, the students were divided: **50%** preferred 15-week semester length courses and **50%** preferred short courses. Evenings were the first choice of three-fifths of the students, then weekends, days were least desirable.

WHY SOME DROPPED:

Noncompleters, Achievers, and Nonachievers were asked why they did not continue Telecommunications Technology. A summary of their reasons is provided in Table 3, only four expressed dissatisfaction with the program itself and others commented **"Excellent program, sorry I left"** and **"Good program"**.

TABLE 3. Selected responses to:
WHY DIDN'T YOU COMPLETE THE TELECOMMUNICATIONS PROGRAM? (N=68)

Job schedule/commute	17
Got a job	7
Personal (e.g., trip, pregnancy)	4
Changed major	3
Too much work*	5
Lost interest*	5
Already knew [401] material§	3
Won't get her a promotion	1
Dissatisfied with the program°	4

* These are not uncommon reasons for students to withdraw from community college classes.

§ These students have two-year degrees in electronics.

° Two added that more hands-on lab. would be desirable.

CONCLUSIONS

A number of respondents praised Telecommunications Technology and thanked Skyline College and the Telecommunications staff. One comment summarizes these. **"Your TCOM program was, is, and will be an excellent opportunity for students."** Another student said, **"This program got me in the door of an exciting career."** In their excitement for their own careers and this rapidly expanding industry, instructors and other industry professionals **"hype the great industry"**, as one respondent said, forgetting that the students are being prepared for entry level jobs. A few comments addressed the disappointment students felt when they found that the first job is difficult to get and starting wages are lower than they expected. The fact that half of the employed students had to take on-the-job-training courses reminds us that they are being prepared for entry-level jobs.

Even students who did not graduate added: **"It's excellent!!" "I learned a lot." "Thanks!!!"**

While keeping in mind the attributes of Telecommunications Technology, two respondents remind us **"You have a good foundation to build the best training program in the Western region"**; **"You have the potential"**. In education, we teach our students to set goals and to strive to achieve those goals. Three items reiterated by each group of respondents might serve as bases for goals for Telecommunications Technology. These are

➡ A consistent approach to hands-on laboratory work in each class is urged. Almost every respondent wrote in **"more hands-on"**. After introductory material students suggested: bringing up the system and troubleshooting. At least three graduates would like to return to the same classes to get more hands-on experience. There appears to be variability between sections of the same class so that while some students want switching others want basic electricity added to the program.

➡ The **job faire** was found to be highly desirable and useful and, an annual job faire, if possible, would be an asset to the program. Additional suggestions included an on-going bulletin board listing jobs and salaries; listings of where students have been hired recently; and resumé preparation. An added benefit of a job faire will be to increase the industry's awareness of Telecommunications Technology and facilitate placement of graduates.

➡ Many of the students rely on their instructors for **counseling** but the classes are primarily offered in the evening and the instructor's time must be directed to coursework. These students are adults ranging in age from 18 to 55 years old and they can be frustrated by being in school rather than working full time and earning the salary they want. An attempt to provide some educational/career planning during each semester might minimize students' frustrations and confusion about their futures.

And, finally,

➪ A few graduates would like an associate degree and one added that an associate degree would tangibly affect financial and promotional opportunities.

Appendices

1 - Graduates
2 - Noncompleters
3 - Achievers
4 - Nonachievers
5 - Experienced
6 - Cover letter to students

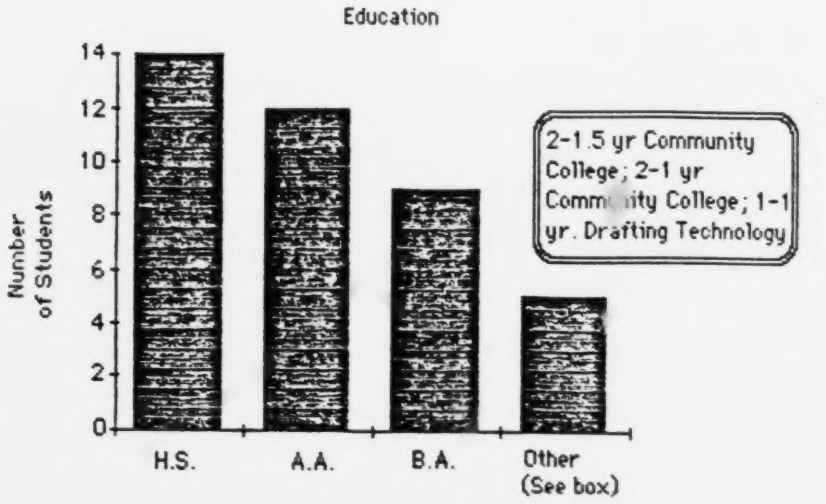
Graduates

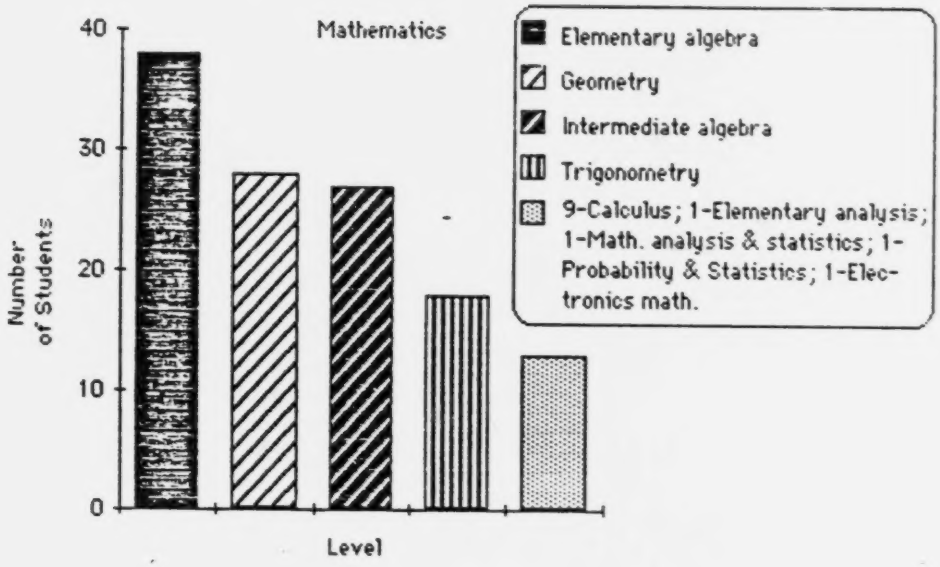
Completed TCOM 401, 430, and 440

Number of students: 91 (-10 address unknown) = 81
Number of responses: 42 (52%)
Age: 30 years (18-54)
Sex: 34 Male, 8 Female
TCOM grades:

Course	A	B	C	D
401	19	15	7	1
430	13	14	15	-
440	15	14	12	1
680	-	-	-	1

Assessment test scores:
Mechanical reasoning: 69-34, average 54
Numerical ability: 40-17, average 29
Spatial relationships: 58-26, average 40
Verbal reasoning: 50-19, average 40





Number employed in TCOM before program: **10**
Number employed in TCOM after graduating: **26** (See page 9)

Responses to Questionnaire

1. What is your current employment status?
   - 34 Employed full-time
   - 3 Employed part-time
     - 1 This is all I can get
     - 0 This is all I care to work
   - 3 Unemployed
     - 2 I am looking for a job
     - 1 I have been employed in telecommuncations since completing TCOM.

2-4. Concerning employment.
24 (including 6 women) employed in Telecommunications. See page 9.

5. What is your approximate hourly wage? **$11.02** per hour.

6. After completing TCOM did you complete a company training program?
   - 9 Yes (2 currently enrolled)
   - 18 No

If yes, what topics were covered in this training program?

-E-911 systems, concentrator and identification (Pacific Bell).

-Northern Telecom digital multiplex switching. Monitoring problems and clearing alarms (lockouts, B1-polar violations). Building sub-commands for testing on CKTS via terminals. System architectures (Starnet Corp).

-Intro to CBX 8000 desk top (Rolm).

-Various installation courses (PacTel).

-Basic installation, data fundamentals, signalling for voice circuits, customer satisfaction skills ((Pacific Bell).

-Customer relations, cable installation safety, tool identification, use of measurement meters, D/O theory, adjusting levels (Telecommunications Inc).

-Use of testing equipment (MCI).

-Analog modulation, modern front end processor theory, installation, diagnostic, troubleshooting (Postal Data Center).

7. What is your current schooling status?
   - 1 In school full-time
   - 12 In school part-time

Skyline College: Electrical engineering

TCOM 100 (3)
Science
Golden Gate University: Telecommunications management
Foothill College: Data communications
West Valley College: Advanced data and digital communication
CCSF: Aeronautics and avionics
Labor studies
American River College: Range management
CSM: Pilot ground school

8. Do you feel you received an employable skill from your TCOM courses?

25 Yes
14 No[1]

9. Did TCOM provide an understanding of future careers in the Telecommunications industry?

37 Yes
5 No[2]

10. TCOM resulted in better job mobility (such as a promotion or better job) for me. (Check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
10	13	7[3]	7[4]	3

11. In general, how much help was TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	11	17	11	3
b. Knowing what the jobs are	8	21	11	2

[1]More hands-on equipment in lab. (2x)
Very little transmission skill or hands on "field" experience
He already knew the material.

[2]Technical or managerial - not examples of job titles.
More time should be spent on this.

[3]Not at this time, there is a surplus condition [at Pacific Bell] so transfers are available. (2x)

[4]Not in my field but there was some good information.

c. Finding needed job-related information	8	17	12	5
d. Getting along with customers and coworkers	2	14	12	13
e. Being able to talk to the boss about job problems	3	11	11	15
f. Applying for a job	8	18	6	10
g. Interviewing for a job	7	15	8	12
h. Career advancement	6	18	12	6

12. Please rank the following instructional activities in terms of how you learned best.

	(best) 1	2	3	4	5 (least)
Lecture	8	17	9	7	1
Demonstration	14	12	7	5	4
Hands-on Lab.	22	6	1	6	7
Reading	10	13	8	8	3
Written homework	7	3	17	6	9

13. Please indicate how the following instructional activities were used overall in TCOM.

	Too much	Just right	Too little
Lecture	17	23	1
Demonstration	□	14	28
Hands-on Lab.[5]	□	5	37
Reading	5	32	4

[5]Lab for [440] was practically nonexistent. No lab. after [401].

Written homework[6]	0	26	15

14. How would you evaluate the help which you received from Skyline's counselors?

7 High. I got as much help as I needed.
11 Average. I got some help.
0 Low. I didn't get any help.
21 Neutral. I never needed or sought any help.

15. Was placement service offered to you?

30 Yes
11 No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

Job faires. (12x)
A list of companies that will/may hire students from TCOM and also job descriptions from these companies to prepare students for applying. (5x)
Improved credibility with TCOM companies.
Placement service for those with little previous TCOM experience. "...The first job is very, very, very difficult to get."
Same as provided [for Qantas workers]. (2x)
Company-sponsored tours. (2x)
Resumé writing and interview techniques. (4x)
Assistance getting interviews.
On-campus recruitment. (2x)
Career directory for entry-level techs.

17. What learning experiences do you feel should be added to the TCOM program?

Hands on experience with equipment and test instruments. (2x)
Hands on with data communitications.
A fully operational lab. Structured labs. with specific objectives. (7x)
More homework. (2x)
More field trips.
Beginning level terminal work.
Co-op program/internships for students in 401/430. (3x)
Basic electronics.
Courses similar to those being offered at Golden Gate Univ.
Days where a student goes to work with a technician.
Less electronics theory and more use of measuring equipment in relation to signal. Use of fiber optic materials (splicing, troubleshooting).

[6]None was given

Learning the basic skills of IDF construction, cable-running, etc.

Have lab. set up so students can troubleshoot CDX equipment and phone line problems. (2x)

Switch maintenance/installation lab work. Lab on terminal-modem communication. Key system lab (1A2).

More hands on on how to use TIMS, oscilloscope, and data scope. Telephone history can be omitted. (2x)

Human relations; TCOM management; FCC Test review.

Better texts.

18. What additional courses do you feel should be part of the TCOM program? Check as many as appropriate. **All were marked >20 times.**[7]

In the second column, rank from the most important (1) to least important (3), the three courses you would like in the TCOM program. Please mark three boxes only in the second column.

1	2	3	
7	5	2	Switching theory
3	5	5	Network management
6	5	4	Microwave technology
1	4	8	Satellite technology
3	8	4	Fiber optics
6	2	4	Local area networks
10	0	1	Managing a telecommunications system
6	0	2	Management skills training

Other. **Higher level of basic electricity and telephony. Transmission theory/Basic electricity/(Hands-on) wiring. KTS vs. Electronic sets. FCC general class license prep. Key systems. Data/transmission/ electonics.**

19. When would you prefer to take additional TCOM courses?

19a. 24 15-week semester length courses
23 Short courses

19b. 4 Days
33 Evenings
9 Weekends

[7] The three main courses should be expanded before adding other courses. Three semesters is too short.

20. Selected comments.

*"I want to thank you Mr. Biederman and Skyline for being such a help."
*"Your TCOM program was, is, and will still be, an excellent opportunity for students."
*The TCOM program helped her get a promotion. She thinks electronics should be a prerequistie to [401]. She needs more theory in her work.
*He wants to be informed on the status of the A.S. TCOM degree.
*TCOM provides useful information but not enough regarding systems management. She will continue taking TCOM courses.
*The TCOM program taught him enough to get his FCC license.
*He would like to enroll in any new courses to get more hands-on experience. (3x)
*He would be willing to share his job skills with the current classes. He feels there wasn't much instruction in IDF constructions, cross-connecting, and troubleshooting.
*Keep up the good program and keep good instructors.
*This program got him in-the-door of an exciting career. Although he learned a great deal, he feels that the College has potential for more. "...You have a good foundation to build the best training program in the Western region, You have the potential."
-Initial information about job availability and wages was greatly exaggerated. (2x)
-Since receiving his certificate, he has been looking for a job and most companies don't hire entry-level personnel...when they do the starting salary is lower than the average "craft technician".
-Need to get industry to be more aware of Skyline's TCOM program and more willing to hire graduates (even though they have not had paid work experience).
-The teachers knew their field, but they need outlines and learning objectives. (2x)
-He was disappointed with the expense (tool kit and book) and no lab.
-He would like a two-year program.
-Associate degree would tangibly affect financial and promotional opportunities (as per her boss).

Employment: Before entering TCOM, if in TCOM industry.	Currently, if in TCOM industry.
--	Bay Area Systems (Agent for PacTel) Telemarketing Setting up appointments for sales reps.
--	Pacific Bell - Network Special Services Systems Tech. Installation/maintenance of 2-wire and 4-wire voice and data circuits; testing these circuits with TIMS and other test equipment.
--	GTE Sprint Traffic Software Analyst Computer programmer/analyst
--	PacTel Communications System Maintenance Engineer Troubleshoot wiring, programming, hardware problems.
--	Pacifica TCI Cable Utility Person Checking TV converters. Cable TV installer.
--	Telecommunications Inc. Tech III, Service Technician Maintain and troubleshoot coaxial cable systems, adjust amplifiers; provide customer service.
--	Geotech Services Technician second class Running 6-pair cable. Installing RJIIs; punching down and constructing IDFs using BIX distributors. Line-tracing. Troubleshooting.
--	MCI Technicial Services Rep.

Installation and servicing MCI advantage units (autodialers).

-- USPS SMPDS
TCOM Tech. trainee

-- Chronicle Videotex (Bay Area Teleguide)
Technician
Install, maintain, and repair computer terminals and related TCOM equipment.

-- Rolm
Tech I
Install phones, modems, desktop, run cables.

-- U.S. West Information Systems
Field Service Technician
Prefield jobs; service PABX and key systems (knowledge of schematics mandatory); installing peripheral devices.

-- Bank of America
Telecom Analyst
Analyzing and troubleshooting logical and physical problems on a public data network.

-- GTE Sprint (laid off)
Facility Management Specialist
Assign facility inventories to service orders, maintain database, support Network Operations.[8]

-- U.S. Telecom
Technician II
Installation and maintenance of autometic dialers (long distance); mainly wiring and programming.

-- Bank of America
Operations TCOM Analyst

[8]He felt he could not apply much of what he learned in TCOM and, at GTE, was unable to transfer to an entry-level position.

	Supporting remote data comm. equipment for B of A in No. Calif.
--	Starnet Corp/Operations Operations Engineer Daily AMA tapes; checking for lockouts; using TMS and Ω meter; accepting CKTS from Telco by testing with 3 tone slope, noise, and ERL.
--	TIE Communications Technical Service Engineer Troubleshooting phone system; keeping lab. equipment running.
Tele-Count Engineers, Inc. Data Coordinator Compiling missing data questions, expedite priorities, and keeping the job-flow.	--
IBM Field Engineer Computer technician	--
Pacific Telephone Communications Technician Data transmission, teletype, and voice installation and repair in the central office.	Pacific Bell - Network Special Services Systems Technican (Installer/Repairman) Wiring single-unit or multi-unit voice, data teletype circuits. Ordering parts. Reading blueprints. Planning jobs.
J-Tron Communications Technician Repair and install audio equipment.	Low-Voltage Specialties Owner Telecommunications Services
U.S. Postal Service Telecommunications Specialist Design, maintain equipment for national network.	USPS Data Operations Division Program Manager network operations
Pacific Bell Staff Clerk Process and track all special service business orders for installation. testers for data, 2 wire and 4-wire	Pacific Bell: Special Services Repair Staff Clerk Dispatcher Take oral and printed reports from troubles for businesses. Dispatch

Pacific Telephone
Plant Service Clerk
Sorting, coding, dispersing data/voice service orders; data processing. maintain computer hardware, write

Pacific Telephone
Staff Clerk
Processing Orders for telecommunication lines and equipment

MCI
Troubleshooting Clerk
Receive troubles, search data in switching pull and take statistics; test calls in switch, pull traffic reports.

Pacific Telephone
Service Technician
Installation of phone, service, and maintenance of equipment.

these reports for techs. Close out reports and status repair reports. Computer billing. Input statistics into IBM regarding repair reports and techs.

Pacific Bell: Special Services
Installation and Repair
Systems Administrator
Instruct classes on basic computing, application software.

Pacific Bell
Staff Clerk - Repair Dispatch
Dispatch repairmen on special svc CKTS.

MCI Telecommunications
Operations
Technical Service Representative I
Installings of voice and data circuits. Accept loops for Telco. Software updates.

Pacific Bell: Operations
Service Technician
Interface with customers, reading service orders, testing cable pairs, climbing poles, operate test equipment, running wires, soldering, punching down wire.

The Questionnaire

1. What is your current employment status? Please complete the appropriate section.

☐ Employed full-time. If your job is not in the telecommunications industry skip to question 7.

☐ Employed part-time. If you work part-time (less than 30 hours per week) check the reason why
- ☐ This is all I care to work.
- ☐ This is all I can get.

If your job is not in telecommunications skip to question 7.

☐ Unemployed. If you are presently unemployed check the reason why
- ☐ Full-time homemaker
- ☐ I don't care to work
- ☐ I am looking for a job

Have you been employed in telecommunications since completing TCOM?
- ☐ Yes
- ☐ No, go to question 7

If yes, go to question 3 and answer for your most recent job.

2. What is the name of the company/division you work for?

_____

_____

2a. **Optional.** We would like your supervisor's opinion of the TCOM program, please provide the name and address of your supervisor.

_____

_____

3. What is your job title?_____

_____

4. What are your job duties? (Job duties are tasks you are required to do in your job such as soldering, ordering supplies, laying out parts, reading charts, wiring, and the like.)

_____

_____

_____

_____

5. What is your approximate hourly wage? $_____per hour.

6. After completing TCOM did you complete a company training program?

☐ Yes
☐ No

If yes, what topics were covered in this training program?

_____
_____
_____
_____

7. What is your current schooling status?

☐ In school full-time
☐ In school part-time

7a. If you checked one of these, what school are your attending?

_____

7b. What program/major are you studying?

_____
_____

8. Do you feel you received an employable skill from your TCOM courses?

☐ Yes
☐ No

9 Did TCOM provide an understanding of future careers in the Telecommunications industry?

☐ Yes
☐ No

10 TCOM resulted in better job mobility (such as a promotion or better job) for me. (check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
_____	_____	_____	_____	_____

Please turn page

11. In general, how much help was TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	☐	☐	☐	☐
b. Knowing what the jobs are	☐	☐	☐	☐
c. Finding needed job-related information	☐	☐	☐	☐
d. Getting along with customers and coworkers	☐	☐	☐	☐
e. Being able to talk to the boss about job problems	☐	☐	☐	☐
f. Applying for a job	☐	☐	☐	☐
g. Interviewing for a job	☐	☐	☐	☐
h. Career advancement	☐	☐	☐	☐

12. Please rank the following instructional activities in terms of how you learned best.

	(best) 1	2	3	4	5 (least)
Lecture	☐	☐	☐	☐	☐
Demonstration	☐	☐	☐	☐	☐
Hands-on Lab.	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Written homework	☐	☐	☐	☐	☐

Please turn page

13. Please indicate how the following instructional activities were used overall in TCOM.

	Too much	Just right	Too little
Lecture	☐	☐	☐
Demonstration	☐	☐	☐
Hands-on Lab.	☐	☐	☐
Reading	☐	☐	☐
Written homework	☐	☐	☐

14. How would you evaluate the help which you received from Skyline's counselors?
   - ☐ High. I got as much help as I needed.
   - ☐ Average. I got some help.
   - ☐ Low. I didn't get any help.
   - ☐ Neutral. I never needed or sought any help.

15. Was placement service offered to you?
   - ☐ Yes
   - ☐ No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

_____
_____
_____
_____

17. What learning experiences do you feel should be added to the TCOM program?

_____
_____
_____
_____

Please turn page

18. What additional courses do you feel should be part of the TCOM proram? Check as many as appropriate.

In the second column, rank from the most important (1) to least important (3), the **three** courses you would like in the TCOM program. Please mark three boxes only in the second column.

✓	1,2,3	
☐	☐	Switching theory
☐	☐	Network management
☐	☐	Microwave technology
☐	☐	Satellite technology
☐	☐	Fiber optics
☐	☐	Local area networks
☐	☐	Managing a telecommunications system
☐	☐	Management skills training
☐	☐	Other. (Please specify)_____

_____

_____

19. When would you prefer to take additional TCOM courses?

19a. ☐ 15-week semester length courses
☐ Short courses

19b. ☐ Days
☐ Evenings
☐ Weekends

20. Comments. Please write any additional comments below.

If the address (used to mail this questionnaire) is incorrect, please provide your correct address so that you can receive information on future TCOM courses and events.

Name_____
Address_____
City, State_____Zip_____

Thank you!

ID #_____
For coding purposes only.
Your responses are confidential.

Noncompleters

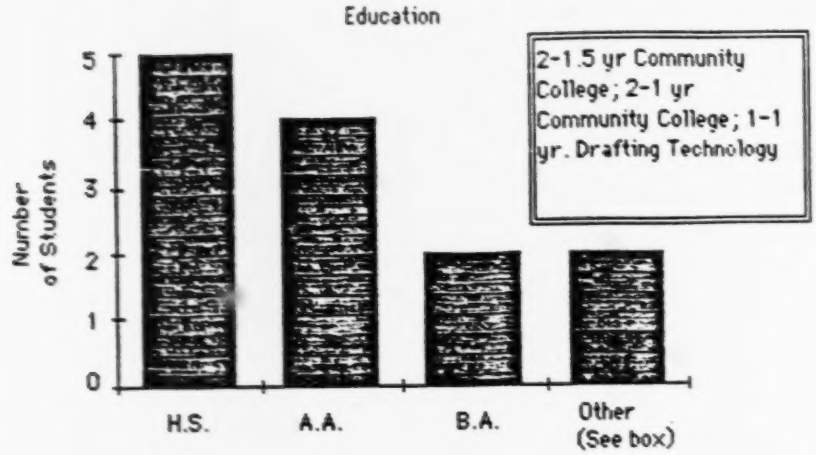
Completed TCOM 401 but withdrew from TCOM 430 or TCOM 440.

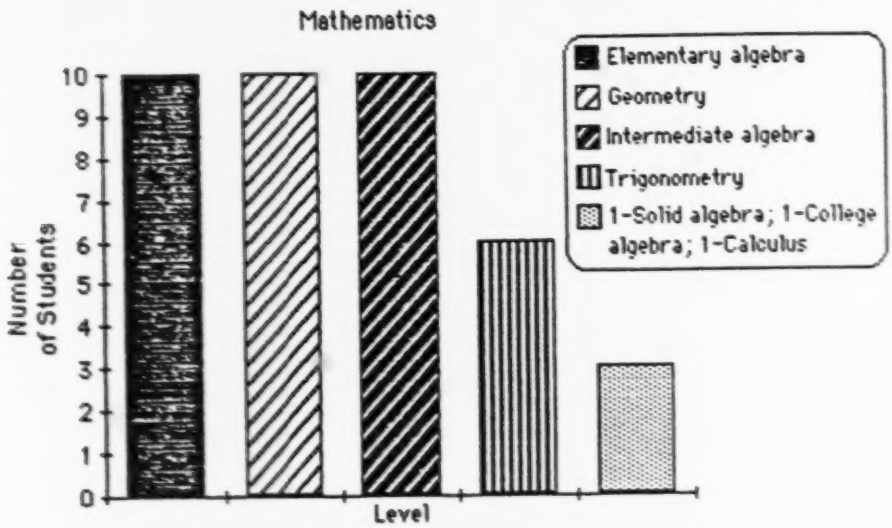
Number of students: 26 (-7 address unknown) = 19
Number of responses: 13 (68%)
Age: 30 years (20-44)
Sex: 10 Male; 3 Female
TCOM grades:

Course	A	B	C	D	F	W
401	4	6	2	1	-	-
430	-	-	2	-	2	9
440	-	-	-	-	-	4

Number who want to return to program: 2

Assessment test scores:
Mechanical reasoning: 65-38, average 52
Numerical ability: 39-24, average 32
Spatial relationships: 48-29, average 38
Verbal reasoning: 49-21, average 41


Education
2-1.5 yr Community College; 2-1 yr Community College; 1-1 yr. Drafting Technology
Number of Students
0
1
2
3
4
5
H.S.
A.A.
B.A.
Other (See box)


Mathematics
Elementary algebra
Geometry
Intermediate algebra
Trigonometry
1-Solid algebra; 1-College algebra; 1-Calculus
Number of Students
0
1
2
3
4
5
6
7
8
9
10
Level

Number employed in TCOM before program: 3
Number employed in TCOM after leaving program: 4

Employment: Before entering TCOM, if in TCOM industry.	Currently, if in TCOM industry.
--	Bank of America Telecommunications specialist Maintain voice network.
--	Eaton Corp/Microwave Products Division[1] Microwave Engineering R&D technician. Troubleshoot, align, test hybrid microwave components.
GTE Sprint Network analyst Monitor the grade of SVES implement action based on network forecast.	GTE Sprint Traffic planner.
PT & T Installation supervisor Handle modulation program, prewire, and service orders.	PacBell Special Service Supervisor Handle WATTS lines.
Bank of America Senior Service Technician Service and repair data card system.	--

[1]Completed a company training program covering microwave theory, antenna, components.

Why didn't you complete the Telecommunications program at Skyline College?
-No time. Working more hours. Had heard bad things about the program but will finish some time.
-Left class because of pregnancy. Wishes there was an East Bay program.
-Left because working too many hours. (2x)
-Working fulltime and going to class nights was too much.
-Left because got a fulltime job (not in TCOM).
-Moved, impossible to commute.
-Change in work schedule.
-Didn't like night school; wasn't that interested.
-After completing 401 there were no jobs so he didn't think he could get one after completing 430/440.

Selected Comments:
*The program is a very good one and he hopes to be able to continue in the near future.
*Pretty good. Transmission class useful in his new job.
-[401] was pretty good.
-[401] needs a lot more hands on application to better show how basic theory works.
-Too much theory.
-Having a syllabus and working switch would be good.

The Questionnaire

1. What is your current employment status? Please complete the appropriate section.

☐ Employed full-time. If your job is not in the telecommunications industry skip to question 7.

☐ Employed part-time. If you work part-time (less than 30 hours per week) check the reason why:
- ☐ This is all I care to work.
- ☐ This is all I can get.

If your job is not in telecommunications skip to question 7.

☐ Unemployed. If you are presently unemployed check the reason why
- ☐ Full-time homemaker
- ☐ I don't care to work
- ☐ I am looking for a job

Have you been employed in telecommunications since leaving the TCOM program?
- ☐ Yes
- ☐ No, go to question 7

If yes, go to question 3 and answer for your most recent job.

2. What is the name of the company/division you work for?

_____

_____

2a. **Optional.** We would like your supervisor's opinion of the TCOM program, please provide the name and address of your supervisor.

_____

_____

3. What is your job title? _____

_____

4. What are your job duties? (Job duties are tasks you are required to do in your job such as soldering, ordering supplies, laying out parts, reading charts, wiring, and the like.)

_____

_____

_____

_____

Please turn page

5. What is your approximate hourly wage? $_____per hour.

6. Did you complete a company training program?
   - ☐ Yes
   - ☐ No

   If yes, what topics were covered in this training program?

   _____
   _____
   _____
   _____

7. Why didn't you complete the Telecommunications program at Skyline College?

   _____
   _____
   _____
   _____

8. Comments. Please write any additional comments below, use the reverse if needed

If the address (used to mail this questionnaire) is incorrect, please provide your correct address so that you can receive information on future TCOM courses and events.

Name_____
Address_____
City, State_____Zip_____

Thank you!

ID #_____
For coding purposes only.
Your responses are confidential.

Achievers

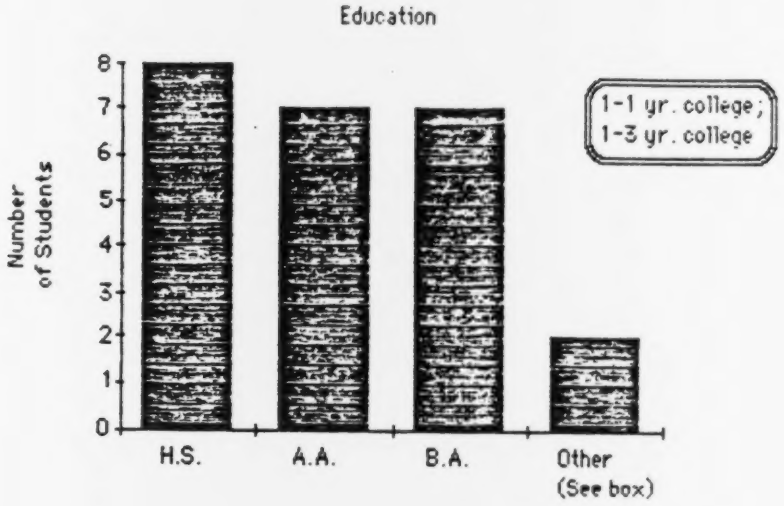
Completed TCOM 401 and/or TCOM 430; did not register for the next course

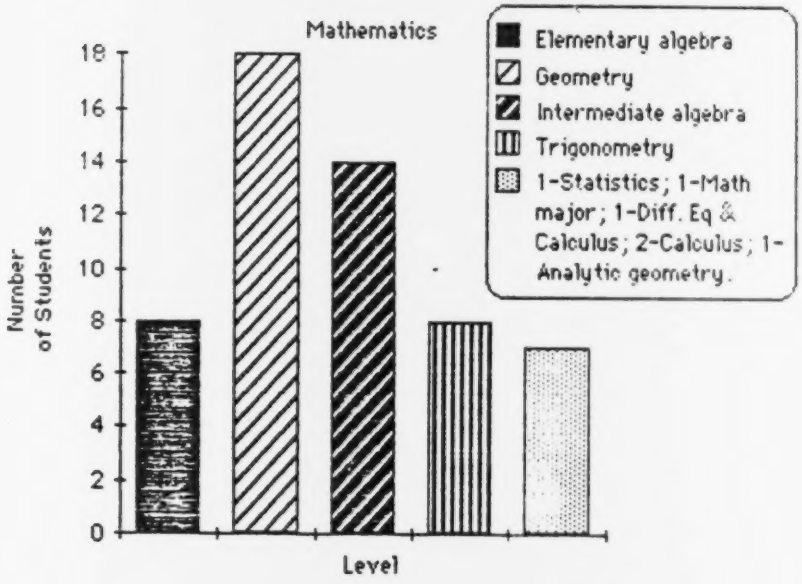
Number of students: 183 (-54 address unknown) = 129
Number of responses: 32 (25%) 1 Refused to answer
Age: 30 years (22-44)
Sex: 24 Male, 8 Female
TCOM grades:

Course	A	B	C	D	F
401	7	14	7	1	3
430	1	5	1	-	2
440	-	-	-	-	-
680	-	-	-	-	1

Number who plan to return to program: 5

Assessment test scores:
Mechanical reasoning: 66-40, average 51
Numerical ability: 37-13, average 29
Spatial relationships: 56-27, average 41
Verbal reasoning: 50-22, average 39





Number employed in TCOM before program: 15
Number employed in TCOM after leaving program: 13 (See page 9)

Responses to Questionnaire

1. What is your current employment status?
   - 26 Employed full-time
   - 1 Employed part-time
     - 1 This is all I can get
   - 1 Unemployed
     - 1 I am looking for a job

2-4. Concerning employment.
   - 13 **(including 4 women)** employed in Telecommunications. See page 9.

5. What is your approximate hourly wage? $13.55 per hour.

6. Did you complete a company training program?
   - 9 Yes
   - 7 No

If yes, what topics were covered in this training program?
Usage of test vehicles; testing procedures (PacBell)
Basic telephony; data circuits (PacBell)
Ordering telephone service for customers (PacBell)
Dimension 400, System 72 (AT&T)
Computer applications; networks; components (PacBell)
Coding and defining a Rolm CBX; CBX maintenance; CBX data configuration.

7. What is your current schooling status?
   - ☐ I am presently enrolled in TCOM 430 or 440.
   - 32 I am not enrolled in TCOM 430 or 440 at present.

7a. If you are not currently taking TCOM 430 or 440, why not?
Just completed 15 units at Golden Gate Univ. for TCOM management certificate (TCOM 430 counted 3 units toward his certificate).
He is trying to arrange to return to school.
He changed his major (and is employed at PacBell).
He needed a semester off to evaluate his job situation.
The commute is too long. (3x)
He had a schedule conflict. (4x)
Works swing shift.
She will continue. (2x)
Changed major (2x) / Pursing an M.B.A. / Programming
He got a job (4x) / Auto industry / Broadcasting / Aircraft maintenance
She is no longer in the TCOM industry. (2x)

He feels he needs work experience before advancing to [440] and recommends this to other students.
Starting salaries too low.
Does not interest me.
Registration material not sent (2x)
Too much work.

8. Do you feel you are receiving an employable skill from your TCOM courses?

18 Yes[1]
12 No

9. Is TCOM providing an understanding of future careers in the Telecommunications industry?

23 Yes
9 No[2]

10. I feel confident that TCOM will result in better job mobility (such as a promotion or better job) for me. (Check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
7[3]	12	7	4	0

11. In general, how much help is TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	9	10	10	□
b. Knowing what the jobs are	5	12	11	1
c. Finding needed job-related information	3	12	11	3
d. Getting along with customers and coworkers	5	9	7	8
e. Being able to talk to the boss about job problems	3	9	7	10

[1]Allowed her to switch from software only to software and hardware. (Rolm)
[2]He feels only a part of the TCOM industry was addressed.
[3]She was immediately promoted (and after 8 months was surplused). (PacBell)

f. Applying for a job	7	9	6	7
g. Interviewing for a job	8	6	9	6
h. Career advancement	5	11	8	4

12. Please rank the following instructional activities in terms of how you learn best.

	(best) 1	2	3	4	5 (least)
Lecture	9	6	7	4	2
Demonstration	10	12	3	2	2
Hands-on Lab.	17	5	4	2	1
Reading	4	6	12	4	2
Written homework	1	8	7	9	2

13. Please indicate how the following instructional activities are used overall in TCOM.

	Too much	Just right	Too little
Lecture	12	13	3
Demonstration	□	11	17
Hands-on Lab.	1	9	18
Reading	8	18	2
Written homework	2	16	9

14. How would you evaluate the help which you receive from Skyline's counselors?

7 High. I get as much help as I need.
6 Average. I get some help.
8 Low. I don't get any help.
9 Neutral. I never need or seek any help.

15. Is placement service offered to you?

5 Yes
19 No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

Job faires (5x)
Bulletin board; continual job listings; include salaries (3x)
On-going recruitment
Internships (2x)
On-campus interviews (2x)
Direct placement
Coaching to put TCOM students ahead of off-the-street applicants

17. What learning experiences do you feel should be added to the TCOM program?

TCOM switching system (virtual CKTS); LAN; Microwave
Key systems
More basic telephony (2x)
More electrical theory and hands-on
Internships (2x)
Explain that employment after TCOM program will be entry-level
Field trips (2X)
Actual troubleshooting; bringing up a system
Certification on equipment

18. What additional courses do you feel should be part of the TCOM program? Check as many as appropriate.

In the second column, rank from the most important (1) to the least important (3), the **three** courses you would like in the TCOM program. Please mark three boxes only in the second column.

✓	1,2,3			
12	9		3	Switching theory
15	2	2	6	Network management
12	4	3	3	Microwave technology
12	4	6	2	Satellite technology
16	4	4	2	Fiber optics
7	2	3	3	Local area networks
17	3	3	6	Managing a telecommunications system
8	2	3	3	Management skills training

Other. **Satellite tech. and fiber optics should be one course. Special svc theory. Computer diagnostics. Computer operations VS & MVS)OS, JCL,job streams, SNA,SDLC,NCCG. Computers & modems. Equipment installation & switching. Basic wiring.**

19. When would you prefer to take additional TCOM courses?[4]

19a. 12 15-week semester length courses
16 Short courses

9b. 6 Days
16 Evenings
11 Weekends

20. Comments.

•"I very much enjoyed [401 and 403] and the knowledge that I acquired. I would have very much liked to have attained my certificate"
•"I have decided to pursue a career in aircraft maintenance. [401] helped me pass my entrance exam. Thanks!!!"
•"I would very much like to finish the TCOM program but because of problems I had to stop."
•"Your program has a lot of potential if you have more classes and quality instruction."
•"More hands-on. But I really liked [401]. I will be going back and I hope the program continues. It's excellent!! I learned a lot."
-Math prerequisite or Math for TCOM course with logs. and trig. functions is needed.
-[430] was weak on hands-on.

[4]One student wrote-in that he preferred correspondence courses.

-He would like more daytime classes.
-Lab/lecture instructors did not agree (Sp 85); H-P Manual was not used.(2x)
-He got tired of the "hype of the great industry" they were getting into.
-The blue text (Telecom Book) cost $80 and was not used; it is not even good reference material for beginning students.
-Starting wages were exaggerated.
-Lack of standards in testing and grading. (3x)
-More hands-on.

Employment: Before TCOM, if in TCOM industry.	Currently, if in TCOM industry.
--	AT&T Information Systems Systems Tech. Installation & maintenance of large phone systems on customers' premises.
--	S.F. Police Department Teleprocessing Technician Install all communications/ hardware (phone & IBM).
--	Rolm Technician Adds, moves, & changes hardware & software of Rolm CBX, schedules other technicians, maintains logs.
--	Tandem Computers Inc Systems Test Technician Test PC backplates installed on CPU, tape, & disk drives. Test ports A-B on processor, memory, sync, controller boards. Build systems. Bring system up, perform software diagnostics.
S.P. Communications Service Operator Schedule, track, and troubleshoot installation, change, and disconnect orders for leased lines.	--
Pacific Telephone Staff Supervisor Personnel administrator on V-P's staff.	--
Micromation Inc. Assembler Assemble and test sub--components.	--
G.T.E.Sprint Lead computer operator Monitor & run batch jobs on two online tandem system.	--

Bank of America
Network Technician
Troubleshoot/diagnose network problems.

Pacific Bell
Analyst
Computer input addresses of field work.

PT&T
Plant Reports Clerk
Coin telephone accounts.

PT&T
Test Desk Technician
Test and coordinate line-ups of data, voice; grade facility line for other communications companies.

Day and Night Communications Inc.
Communications Consultant
Sales, demos, sales coordination.

Pacific Telephone
Staff Clerk
Typing, filing

PT&T
Test Desk Technician
Troubleshoot and turn-up telephone circuits.

Pacific Bell
Office Assistant
Diagnostic tests to isolate teleprocessing network failures; identify failed components.

U.S.P.S. Data Center
Datacommunications Network Specialist. Interface with users, host, and COMTEN/TYMNET.

Chevron/Telecom Div.
Telecom. Tech.
Troubleshoot digital switch, telephones, and data CKTS.

Pacific Bell
Analyst
Verification of databases.

Pacific Bell
Plant Reports Clerk
Coin telephone accounts.

Pacific Bell
Test Desk Technician
Test and coordinate CKT line with installers. Complete paperwork.

Behrman Associates
Owner
Helping clients select phone systems for small businesses; coordinating installation, overseeing training, troubleshooting.

Pacific Bell
Service Representative
Works with CO to get residence phone svc.

Pacific Bell/Network Services
Assistant Manager
Troubleshoot interexchange carrier circuits (voice and data).

Pacific Bell/ISO
Office Assistant
Screen trouble calls and troubleshoot problems via computer applications.

U.S.P.S.
Customer Computer Support Specialist. Help users: log on, do remote payroll, downtime analyses.

The Questionnaire

1. What is your current employment status? Please complete the appropriate section.

☐ Employed full-time. If your job is not in the telecommunications industry skip to question 7.

☐ Employed part-time. If you work part-time (less than 30 hours per week) check the reason why
- ☐ This is all I care to work.
- ☐ This is all I can get.

If your job is not in telecommunications skip to question 7.

☐ Unemployed. If you are presently unemployed check the reason why
- ☐ Full-time homemaker
- ☐ I don't care to work
- ☐ I am looking for a job
- ☐ I am going to school

Have you been employed in telecommunications since completing TCOM 401?
- ☐ Yes
- ☐ No, go to question 7

If yes, go to question 3 and answer for your most recent job.

2. What is the name of the company/division you work for?

_____

_____

2a. We would like your supervisor's opinion of the TCOM program, please provide the name and address of your supervisor.

_____

_____

3. What is **your** job title? _____

_____

4. What are **your** job duties? (Job duties are tasks you are required to do in your job such as soldering, ordering supplies, laying out parts, reading charts, wiring, and the like.)

_____

_____

_____

_____

Plesse turn page.

5. What is your approximate hourly wage? $_____per hour.

6. Did you complete a company training program?

☐ Yes
☐ No

If yes, what topics were covered in this training program?

_____
_____
_____
_____

7. What is your current schooling status?

☐ I am presently enrolled in TCOM 430 or 440.
☐ I am not enrolled in TCOM 430 or 440 at present.

7a. If you are not currently taking TCOM 430 or 440, why not?

_____
_____
_____
_____

8. Do you feel you are receiving an employable skill from your TCOM courses?

☐ Yes
☐ No

9. Is TCOM providing an understanding of future careers in the Telecommunications industry?

☐ Yes
☐ No

10. I feel confident that TCOM will result in better job mobility (such as a promotion or better job) for me. (Check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
_____	_____	_____	_____	_____

Please turn page.

11. In general, how much help is TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	☐	☐	☐	☐
b. Knowing what the jobs are	☐	☐	☐	☐
c. Finding needed job-related information	☐	☐	☐	☐
d. Getting along with customers and coworkers	☐	☐	☐	☐
e. Being able to talk to the boss about job problems	☐	☐	☐	☐
f. Applying for a job	☐	☐	☐	☐
g. Interviewing for a job	☐	☐	☐	☐
h. Career advancement	☐	☐	☐	☐

12. Please rank the following instructional activities in terms of how you learn best.

	(best) 1	2	3	4	5 (least)
Lecture	☐	☐	☐	☐	☐
Demonstration	☐	☐	☐	☐	☐
Hands-on Lab.	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Written homework	☐	☐	☐	☐	☐

Please turn page

13. Please indicate how the following instructional activities are used overall in TCOM.

	Too much	Just right	Too little
Lecture	☐	☐	☐
Demonstration	☐	☐	☐
Hands-on Lab.	☐	☐	☐
Reading	☐	☐	☐
Written homework	☐	☐	☐

14. How would you evaluate the help which you receive from Skyline's counselors?

☐ High. I get as much help as I need.
☐ Average. I get some help.
☐ Low. I don't get any help.
☐ Neutral. I never need or seek any help.

15. Is placement service offered to you?

☐ Yes
☐ No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

_____
_____
_____
_____

17. What learning experiences do you feel should be added to the TCOM program?

_____
_____
_____
_____

Please turn page.

18. What additional courses do you feel should be part of the TCOM program? Check as many as appropriate.

In the second column, rank from the most important (1) to the least important (3), the **three** courses you would like in the TCOM program. Please mark three boxes only in the second column.

✓	1,2,3	
☐	☐	Switching theory
☐	☐	Network management
☐	☐	Microwave technology
☐	☐	Satellite technology
☐	☐	Fiber optics
☐	☐	Local area networks
☐	☐	Managing a telecommunications system
☐	☐	Management skills training
☐	☐	Other. (Please specify)_____

_____

_____

19. When would you prefer to take additional TCOM courses?

19a. ☐ 15-week semester length courses
☐ Short courses

19b. ☐ Days
☐ Evenings
☐ Weekends

20. Comments. Please write any additional comments below, use the reverse if needed.

If the address (used to mail this questionnaire) is incorrect, please provide your correct address so that you can receive information on future TCOM courses and events.

Name_____
Address_____
City, State_____Zip_____

Thank you!

ID #_____
For coding purposes only.
Your responses are confidential.

Nonachievers

Withdrew From TCOM 401

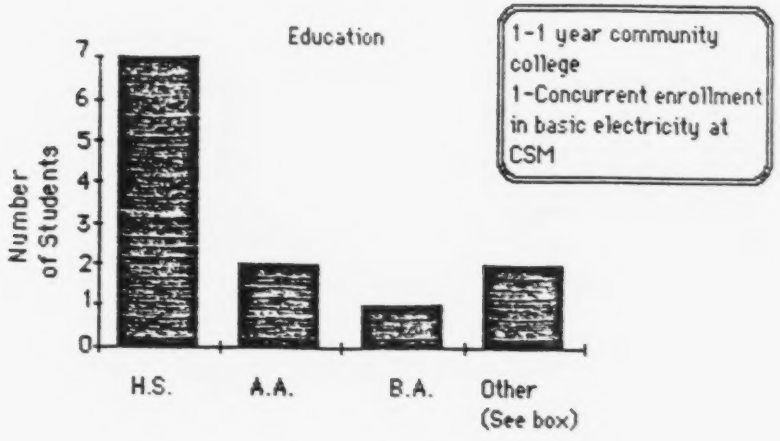
Number of students: 53 (-21 address unknown) = 32
Number of responses: 23 (72%) 2 Refused to answer
Age: 27 years (20-38)
Sex: 16 Male; 7 Female
TCOM grades:

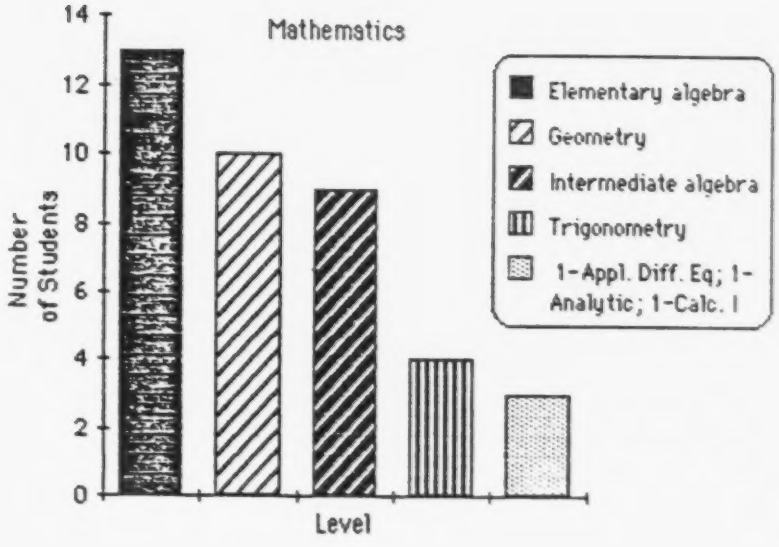
Course	A	B	C	D	F	W
401						23

Number who want to return to program: 6

Assessment test scores:
Mechanical reasoning: 66-33, average 51
Numerical ability: 39-19, average 28
Spatial relationships: 48-31, average 42
Verbal reasoning: 50-26, average 40

Number employed in TCOM before program: 8
Number employed in TCOM after leaving program: 12 (See page 3)


Education
Number of Students
0
1
2
3
4
5
6
7
H.S.
A.A.
B.A.
Other
(See box)
1-1 year community college
1-Concurrent enrollment in basic electricity at CSM


Mathematics
Number of Students
0
2
4
6
8
10
12
14
Level
Elementary algebra
Geometry
Intermediate algebra
Trigonometry
1-Appl. Diff. Eq; 1-Analytic; 1-Calc. I

Employment: Before entering TCOM, if in TCOM industry.	Currently, if in TCOM industry.
--	The Gap, Computer Room Data processing
--	GTE Sprint Budget administrator
--	DataCorp Data processing (shipping/receiving inventory)
--	The Gap, Computer Room Mainframe operator; network point-of-sales
--	Northern Telecom 10S Account Representative (installed base sales) Sales/customer relations[1]
Pacific Bell Computer operator (OFC assistant) Perform diagnostic test to isolate teleprocessing network failures, monitor network	Pacific Bell Mainframe operator, clerical
Pacific Bell Communications Technician Troubleshooting and maintenance of T-carrier equipment, turning up new circuits	Pacific Bell Communications Technician
Selecterm Field Service Technician Maintain computer systems for small businesses	*Full time student in CLC computer training program*
Pacific Telephone Lineman (Outside Plant Tech) Placing phone cable	Pacific Bell Lineman Placing and wrecking cable, pole transfers, reading prints, operating heavy equipment

[1] Company training program on products and sales techniques.

Pacific Telephone
TSPS Operator
Handle calls having to do with "0", OVS,CRCD, SPBL, etc.

Pacific Bell
Service Technician (Installer)[2]
Read maps, blueprints, CO Centrex CO lines. (general business) customer advocate, climb poles, install cable, order parts, stock complete (Bus-Res) line

Harris Corp. Digital Telephone Syst.
Application Engineer
Implementation of PABY business system

Signet Tech.
Works with integrated voice-data transmission

GTE Sprint
Sr. Network Analyst
Analytic support for the Western U.S. switch cut

GTE Sprint
Sr. Network analyst for shared network
Evaluate cost-effectiveness

Pacific Bell
Test desk techician
Test, turn up, and trbl-shoot privste line circuits

Pacific Bell
Test desk technician

[2]Company training program on basic wiring, pole climbing, splicing-color code, G095, "safe work".

Why didn't you complete the Telecommunications program at Skyline College?

-Had too much to do at new job.
-Insufficient time. (3x)
-Working fulltime. (2x)
-Working graveyard.
-Working too many hours.
-He had an opportunity to go to Greece.
-"Personal". Nothing to do with the program.
-Too fast, didn't know enough electronics.
-Felt overwhelmed. Plans on enrolling in 100.
-Wasn't applying himself and started to lose interest.
-Job shift change.
-401 was a repeat of Basic Electricity (at CSM). TCOM certificate wouldn't get her a promotion.
-Got bored (he has an A.A. degree in electronics).
-[401] was too easy (he has an A.A. degree in EE tech).
-Took too much time; too much material to learn.

Selected Comments:

*Excellent course, sorry I left.
*Good program.
*Needs day sections of 430 & 440.
*Enjoyed [401] content.
-He feels he should have been allowed to take 430 because he has an A.A. degree in electronics.
-$60 for a book that was incomplete and wasn't even a book.
-Lab/lecture instructors disagreed. (3x) (Spring 85)
-Homework papers not returned for study.
-Too much time spent on history of the phone company; not enough hands-on.

The Questionnaire

1. What is your current employment status? Please complete the appropriate section.

☐ Employed full-time. If your job is not in the telecommunications industry skip to question 7.

☐ Employed part-time. If you work part-time (less than 30 hours per week) check the reason why
- ☐ This is all I care to work.
- ☐ This is all I can get.

If your job is not in telecommunications skip to question 7.

☐ Unemployed. If you are presently unemployed check the reason why
- ☐ Full-time homemaker
- ☐ I don't care to work
- ☐ I am looking for a job

Have you been employed in telecommunications since leaving the TCOM program?
- ☐ Yes
- ☐ No, go to question 7

If yes, go to question 3 and answer for your most recent job.

2. What is the name of the company/division you work for?

_____

_____

2a. **Optional.** We would like your supervisor's opinion of the TCOM program, please provide the name and address of your supervisor.

_____

_____

3. What is your job title? _____

_____

4. What are your job duties? (Job duties are tasks you are required to do in your job such as soldering, ordering supplies, laying out parts, reading charts, wiring, and the like.)

_____

_____

_____

_____

Please turn page

5. What is your approximate hourly wage? $_____per hour.

6. Did you complete a company training program?
   - ☐ Yes
   - ☐ No

   If yes, what topics were covered in this training program?

   _____
   _____
   _____
   _____

7. Why didn't you complete the Telecommunications program at Skyline College?

   _____
   _____
   _____
   _____

8. Comments. Please write any additional comments below, use the reverse if needed

If the address (used to mail this questionnaire) is incorrect, please provide your correct address so that you can receive information on future TCOM courses and events.

Name_____
Address_____
City, State_____Zip_____

Thank you!

ID #_____
For coding purposes only.
Your responses are confidential.

Experienced

Completed TCOM 440 Without TCOM 401 and/or TCOM 430

Number of students: 12 (-4 address unknown) = 8
Number of responses: 5 (63%) 1 Refused to answer
Age: 37 years (27-52)
Sex: 3 Male, 2 Female
TCOM grades:

Course	A	B	C	D	F	W
401	-	1	-	-	-	-
430	-	2	1	-	-	-
440	1	2	-	-	-	-
680	-	-	-	1	-	-

Applications and assessment test scores are not available for this group.

Responses to Questionnaire

1. What is your current employment status?
   5 Employed full time
   2 **(women)** Employed in telecommunications industry.

2-4. Concerning employment.

AT&T: Field Service Organization
Systems Technician
Software changes on electronic PBX systems; traffic & trunking consultation with my customers; ordering supplies; reading schematics; installing wire for telephone and data uses; using various hand tools and test equipment; system record keeping and inventory; instruct customer on use of features.

IBM Service, San Francisco
Service Representative
Fixing computer terminals, keeping records, operating terminals, training people to operate terminals.

5. What is your approximate hourly wage? $14.50 per hour.

6. After completing TCOM did you complete a company training program?
   1 Yes
   1 No

If yes, what topics were covered in this training program?

Training with [AT &T] is on-going. Since she completed the TCOM program, she has had 6 weeks of data training and 1 week of training on [AT&T's] energy communication system. In addition, there is on-the-job-training for specific functions.

Before TCOM: IBM teleprocessing courses.

7. What is your current schooling status?
   1 In school full-time
   ☐ In school part-time

   7a. If you checked one of these, what school are your attending?
   CCSF
   7b. What program/major are you studying?
   Business/accounting

8. Do you feel you received an employable skill from your TCOM courses?
   2 Yes
   3 No

9. Did TCOM provide an understanding of future careers in the Telecommunications industry?
   2 Yes
   3 No

10. TCOM resulted in better job mobility (such as a promotion or better job) for me. (Check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
____	2[1]	1	2	____

11. In general, how much help was TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	☐	2	1	2[2]
b. Knowing what the jobs are	1	2	1	1
c. Finding needed job-related information	☐	1	2	2
d. Getting along with customers and coworkers	☐	☐	2	3

[1] Only because it is a recently acquired certificate from an accredited institution.
[2] In 430, instructor had us teach ourselves to use equipment but there was no instruction book.

e. Being able to talk to the boss about job problems	□	□	2	3
f. Applying for a job	1	1	1	2
g. Interviewing for a job	1	□	1	3
h. Career advancement	1	2	2	□

12. Please rank the following instructional activities in terms of how you learned best.

	(best) 1	2	3	4	5 (least)
Lecture	□	1	1	3	□
Demonstration	1	2	□	1	1
Hands-on Lab.	2	□	1	□	2
Reading	□	□	3	1	1
Written homework	□	□	2	1	2

13. Please indicate how the following instructional activities were used overall in TCOM.

	Too much	Just right	Too little
Lecture	1	2	2
Demonstration	□	□	5
Hands-on Lab.	□	□	5[3]
Reading	□	3	2
Written homework	□	3	2

[3]In 440 there was no lab.

14. How would you evaluate the help which you received from Skyline's counselors?

- ☐ High. I got as much help as I needed.
- ☐ Average. I got some help.
- 2 Low. I didn't get any help.
- 2[4] Neutral. I never needed or sought any help.

15. Was placement service offered to you?

- 1 Yes
- 4 No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

Company representatives recruiting from program.
Career days. List available jobs. Announcements of companies recently hiring graduates.
Company internship (see question 17).

17. What learning experiences do you feel should be added to the TCOM program?

Internships at companies to provide hands-on experience; for college credit.
More hands-on. More digital theory.
Field trips. Exposure to a more diversified group of instructors.
Get qualified and responsible instructors.

18. What additional courses do you feel should be part of the TCOM program? Check as many as appropriate.

In the second column, rank from the most important (1) to least important (3), the **three** courses you would like in the TCOM program. Please mark three boxes only in the second column.

✓	1,2,3	
3	2,3	Switching theory
3	1,3	Network management
4	2	Microwave technology
3	2	Satellite technology
4	1	Fiber optics
4	1,2,2	Local area networks
4	3,3	Managing a telecommunications system
3	1	Management skills training

[4]Instructors were great.

19. When would you prefer to take additional TCOM courses?

19a. 3 15-week semester length courses
1 Short courses

19b. 1 Days
4 Evenings
1 Weekend

20. Why didn't you complete TCOM {401} {430} ?

1 I already knew the material.
☐ I didn't know I was supposed to.
☐ I had a schedule conflict.
1 Other. **She took 440 to review previously taken courses at IBM.**

The Questionnaire

1. What is your current employment status? Please complete the appropriate section.

☐ Employed full-time. If your job is not in the telecommunications industry skip to question 7.

☐ Employed part-time. If you work part-time (less than 30 hours per week) check the reason why
- ☐ This is all I care to work.
- ☐ This is all I can get.

If your job is not in telecommunications skip to question 7.

☐ Unemployed. If you are presently unemployed check the reason why
- ☐ Full-time homemaker
- ☐ I don't care to work
- ☐ I am looking for a job

Have you been employed in telecommunications since completing TCOM?
- ☐ Yes
- ☐ No, go to question 7

If yes, go to question 3 and answer for your most recent job.

2. What is the name of the company/division you work for?

_____

_____

2a. **Optional.** We would like your supervisor's opinion of the TCOM program, please provide the name and address of your supervisor.

_____

_____

3. What is your job title?_____

_____

4. What are your **job** duties? (Job duties are tasks you are required to do in your job such as soldering, ordering supplies, laying out parts, reading charts, wiring, and the like.)

_____

_____

_____

_____

Please turn page

5. What is your approximate hourly wage? $_____per hour.

6. After completing TCOM did you complete a company training program?

☐ Yes
☐ No

If yes, what topics were covered in this training program?

_____
_____
_____
_____

7. What is your current schooling status?

☐ In school full-time
☐ In school part-time

7a. If you checked one of these, what school are your attending?

_____

7b. What program/major are you studying?

_____
_____

8. Do you feel you received an employable skill from your TCOM courses?

☐ Yes
☐ No

9. Did TCOM provide an understanding of future careers in the Telecommunications industry?

☐ Yes
☐ No

10. TCOM resulted in better job mobility (such as a promotion or better job) for me. (Check one)

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
_____	_____	_____	_____	_____

Please turn page

11. In general, how much help was TCOM in the following areas:

	Much	Some	Little	None
a. Knowing how to use tools and equipment	☐	☐	☐	☐
b. Knowing what the jobs are	☐	☐	☐	☐
c. Finding needed job-related information	☐	☐	☐	☐
d. Getting along with customers and coworkers	☐	☐	☐	☐
e. Being able to talk to the boss about job problems	☐	☐	☐	☐
f. Applying for a job	☐	☐	☐	☐
g. Interviewing for a job	☐	☐	☐	☐
h. Career advancement	☐	☐	☐	☐

12. Please rank the following instructional activities in terms of how you learned best.

	(best) 1	2	3	4	5 (least)
Lecture	☐	☐	☐	☐	☐
Demonstration	☐	☐	☐	☐	☐
Hands-on Lab.	☐	☐	☐	☐	☐
Reading	☐	☐	☐	☐	☐
Written homework	☐	☐	☐	☐	☐

Please turn page

13. Please indicate how the following instructional activities were used overall in TCOM.

	Too much	Just right	Too little
Lecture	☐	☐	☐
Demonstration	☐	☐	☐
Hands-on Lab.	☐	☐	☐
Reading	☐	☐	☐
Written homework	☐	☐	☐

14. How would you evaluate the help which you received from Skyline's counselors?
- ☐ High. I got as much help as I needed.
- ☐ Average. I got some help.
- ☐ Low. I didn't get any help.
- ☐ Neutral. I never needed or sought any help.

15. Was placement service offered to you?
- ☐ Yes
- ☐ No

16. What type(s) of job placement activities do you feel should be offered for TCOM students?

_____
_____
_____
_____

17. What learning experiences do you feel should be added to the TCOM program?

_____
_____
_____
_____

Please turn page

18. What additional courses do you feel should be part of the TCOM program? Check as many as appropriate.

In the second column, rank from the most important (1) to least important (3), the **three** courses you would like in the TCOM program. Please mark three boxes only in the second column.

✓	1,2,3	
☐	☐	Switching theory
☐	☐	Network management
☐	☐	Microwave technology
☐	☐	Satellite technology
☐	☐	Fiber optics
☐	☐	Local area networks
☐	☐	Managing a telecommunications system
☐	☐	Management skills training
☐	☐	Other. (Please specify)_____

_____

_____ _____

19. When would you prefer to take additional TCOM courses?

19a. ☐ 15-week semester length courses
☐ Short courses

19b. ☐ Days
☐ Evenings
☐ Weekends

20. Why didn't you complete TCOM {401} {430} ?
☐ I already knew the material.
☐ I didn't know I was supposed to.
☐ I had a schedule conflict.
☐ Other. Please specify_____

_____

21. Comments. Please write any additional comments below, use the reverse if needed

Please turn page

If the address (used to mail this questionnaire) is incorrect, please provide your correct address so that you can receive information on future TCOM courses and events.

Name_____
Address_____
City, State_____Zip_____

Thank you!

ID #_____
For coding purposes only.
Your responses are confidential.

Telecommunication Technology Skyline College

3300 College Drive □ San Bruno, California 94066 □ 415-355-7000

September 16, 1985

Dear TCOM Student,

As a former Telecommunications student at Skyline College, you are one of our most valuable sources of suggestions on how to improve our program so that we can better serve students and the industry. Your assistance will help us determine whether more and different courses should be offered and when courses and seminars could be scheduled to best meet your needs.

Would you please help us in our efforts by taking a few minutes to complete and return the enclosed form? We have enclosed a stamped envelope and hope to receive your reply by October 15, 1985.

Please be assured that all information you supply will be held in confidence and that your name will never be associated with any response.

We appreciate your cooperation in this important effort.

Sincerely yours,

Donald D. Biederman
Division Director
Science-Mathematics-Technology

Enclosures
TCOM refers to the Telecommunications courses at Skyline College.